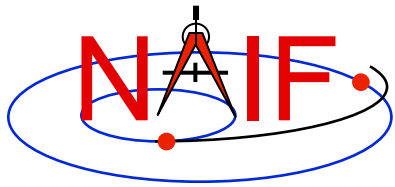


Navigation and Ancillary Information Facility

SPICE Development Plans and Possibilities

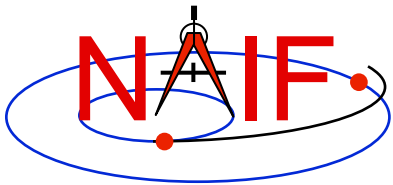
November 2014



Higher Fidelity Shape Models

Navigation and Ancillary Information Facility

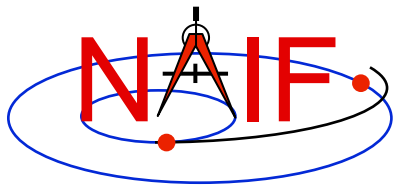
- **Extension of the shape model subsystem**
 - Called Digital Shape Kernel (DSK)
 - Add two new shape model capabilities...
 - » tessellated plate model, for small, irregularly shaped bodies
 - » digital elevation model
 - to the existing tri-axial shape model found in PCK
- **Status**
 - » An alpha-test prototype of the plate model has been given to several projects and persons
 - Date for release of a “final” version has not yet been set
 - » Work on an alpha-test of the digital elevation model is ongoing
 - Date for release of a “final” version has not yet been set



“WebGeocalc”

Navigation and Ancillary Information Facility

- **NAIF is implementing a client-server GUI interface to a SPICE geometry engine**
- **All you need is a standard browser—it connects to a server holding a SPICE-based geometry engine and a large set of SPICE kernels**
- **How might this be useful to you?**
 - Check your own SPICE-based code under development
 - Obtain a quick back-of-the-envelope calculation
 - Diagnose geometry problems
 - Opens SPICE capabilities to non-programmers
- **Version 1.0 was released November 2013**
- **A slightly more capable version should be released during Fall 2014**
- **A programmatic interface to WGC will be added in FY15**
- **See the next two pages for visuals**



WebGeocalc – Input Page

Navigation and Ancillary Information Facility

SPICE Geometry Calculator

wgc.jpl.nasa.gov:8080/webgeocalc/#AngularSeparation

Google NBS JPLSpace NAIF www NAIF ftp NAIF Stuff PDS PDS Stuff CNN Bookmarks

WebGeocalc - A GUI Interface to SPICE
Version 1.0-SNAPSHOT.1960

[About WebGeocalc](#)

Calculation

Angular Separation
Determines the angular separation between two targets, as seen by an observing body.

Mission: ?

Target 1: ?

Target 2: ?

Observer: ?

Separation type: ☐ Body centers ☒ Body figures ?

Input Time

Time system: ?

Time format: ?

Input times: ☐ Single time ☒ Time range ☐ List of times

Start time: ?

End time: ?

Time step: ?

Aberration Correction

Light propagation: ☒ None ☐ To observer ☐ From observer ?

Light-time algorithm: ?

Stellar aberration: ☒ Include stellar aberration correction ?

Error handling: ?

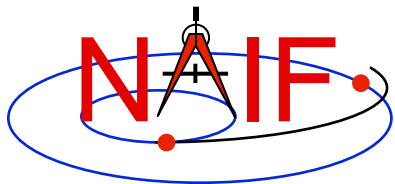
Saved Values

No saved values

Kernels

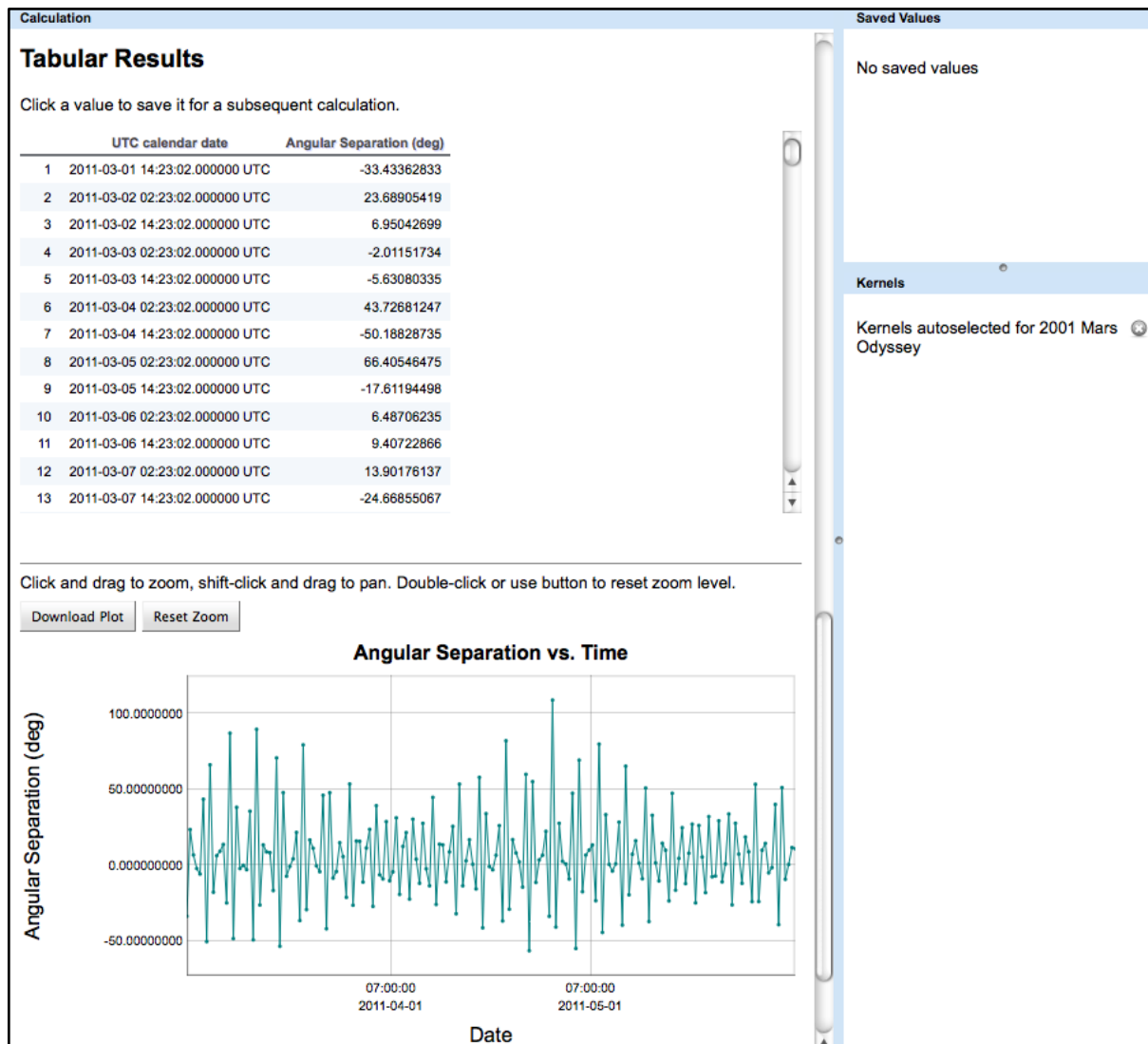
Kernels: autoselected for 2001 Mars Odyssey

Example: compute the angular separation of Phobos and Mars as seen from the Mars Odyssey spacecraft during the period from Mar 01 to June 01, 2011, using a 12 hour time step.



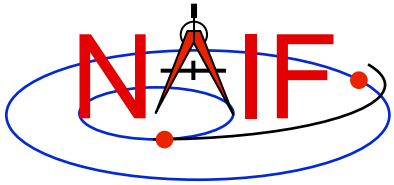
WebGeocalc – Results Page

Navigation and Ancillary Information Facility



Angular separation of Phobos from Mars as seen from the Odyssey spacecraft.

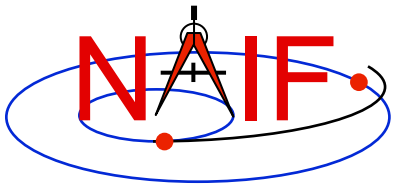
Both numeric and graphic results are provided.



More API Interfaces

Navigation and Ancillary Information Facility

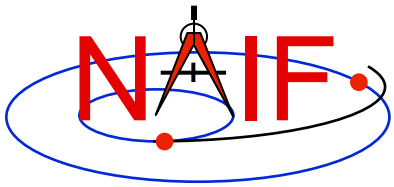
- **Java Native Interface (JNI Spice)**
 - An alpha-test release was made in February, 2010
 - Date for official addition to the Toolkit is TBD
- **Python**
 - Considerable prototyping has been done
 - When this effort will proceed is uncertain
 - » Some SPICE users have built their own (perhaps partial) version: check for these using “spice_discussion”



Some Other Possibilities

Navigation and Ancillary Information Facility

- **More high-level computations, such as instrument footprint coverage**
- **More “geometry finder” computations**
- **Complete the star catalog subsystem started long ago**
- **Additional target models: rings, gravity, atmosphere, magnetosphere, ...**
- **Develop a more flexible and extensible instrument modeling mechanism**



What do **You** Suggest?

Navigation and Ancillary Information Facility

- **NAIF solicits suggestions from the user community.**
 - **Caution: we're a small team and have a large backlog, so we can't promise any particular action.**
- **We're interested in programmatic ideas as well as technical ones.**
 - **Should NAIF promote use of SPICE beyond NASA's planetary science program?**
 - **What amount of cooperation and interoperability with foreign partners is appropriate and achievable?**